BACKGROUND

High risk for suicide is typically assessed by clinicians using questionnaires and interviews. Although useful in a wide range of clinical settings, this assessment approach has many disadvantages e.g., misinterpretation of subtle differences in means of words used in emotional scales, objective and subjective biases and difficulties in reliably assessing the intensity of the emotion. Most significantly, these cues can be missed with catastrophic consequences.

In this context, we suggest that novel, non-intrusive facial affect detection technology could play a role in the clinical evaluation of suicidal ideation. We report on the acquisition of discrete emotional states (i.e., fear, sadness, joy, anger, disgust and surprise) while the patient is participating in a standardised task utilising the presentation of emotionally challenging images.

OBJECTIVES

We sought to test the hypothesis that previously validated biomarkers of high risk for suicide, namely event related potentials (ERP), Galvanic skin response (GSR) and heart rate variability (HRV) can be employed in combination with facial affect and pupil dilation measures, in a novel diagnostic battery that will ultimately increase reliability of clinical evaluations of suicidal persons.

MATERIALS AND METHODS

Participants

Suitable patients and age-gender-matched healthy controls (subjects with no history of suicide ideation, were recruited from South Dublin and Wicklow Mental Health Directorate. All participants were screened by an experienced psychiatrist through a standardized clinically conducted diagnosis of either depression, bipolar depression or borderline personality disorder. Clinical exclusion criteria included current alcohol dependence and/or drug misuse.

Measures acquired and data acquisition technology

Real-time facial and physiological data were acquired using the iMotions FACET system software package (http://imotions.com) integrated with a Shimmer unit to measure GSR and HRV.

Further, we acquired continuous EEG data using the Emotiv EPOC system and headset (http://epoc.com), a wireless high resolution revolutionary brain computer interface capable of recording EEG data comparable to traditional EEG devices. Emotiv EPOC features 14 EEG channels plus 2 references offering optimal positioning for accurate spatial resolution. Channel names based on the international 10-20 electrode location system are: AF3, F7, F3, FC5, T7, P7, O1, O2, P8, T8, FC6, F4, F8, AF4, with CMS/DRL references in the P3/P4 locations and uses sequential sampling method, single ADC, at a rate of 128 SPS or 256 SPS (2048 Hz internal). Emotiv EPOC operates at a resolution of 14 bits or 16* bit per channel with frequency response between 0.16 - 43 Hz. The experimental set up is shown in Fig.1.

CONCLUSIONS

Our preliminary results suggest that our data acquisition set up is sensitive image emotional valence. A larger subject population is needed to confirm these results and to investigate putative anomalies in suicidal patients.